



## FAQ's- Speakers

### Index:

<b>General Speaker Technology .....</b>	<b>Page 2</b>
<b>Electrical Application Issues .....</b>	<b>Page 3</b>
<b>Mechanical Application Issues .....</b>	<b>Page 4</b>
<b>Soldering &amp; Washing Issues .....</b>	<b>Page 5</b>
<b>Sound Issues .....</b>	<b>Pages 6 - 8</b>
<b>Environmental Issues .....</b>	<b>Page 9</b>
<b>Warranty .....</b>	<b>Page 10</b>

## General Speaker Technology

### Q: What is an electronic audible alarm?

**A:** An electronic audible alarm produces an audible warning sound using electronic means. This is in contrast to electro-mechanical alarms that produce sound by mechanical means. Examples of electro-mechanical alarms include the old clapper type alarm clocks, school bells, and car horns. Examples of applications that use electronic audible alarms include smoke detectors and microwave ovens.

### Q: What technologies are used in audible alarms?

**A:** Electronic audible alarms may utilize piezoelectric transducers, electromagnetic technology, or speaker technology. Most electronic audible alarms utilize piezoelectric or electromagnetic technology, but speakers are used when:

- Loud low frequency sounds are required (less than 1 kHz).
- Human voice is required.
- Multiple frequencies are required (such as music).

Using a speaker is a more expensive solution than using a piezoelectric transducer, so speakers are typically only used when piezoelectric technology will not meet all application requirements.

### Q: What is the difference between a bare speaker and a mounted speaker?

**A:** Bare speakers do not contain any acoustic sound chambers, so it is up to the user to mount the speaker properly. Mounted speakers not only are pre-mounted, the housing contains an acoustic chamber which affects the sound characteristics. See the description of an acoustic chamber in the SOUND FAQ Section below.

## Electrical Application Issues

### Q: Do your speakers have polarity?

**A:** No. You can connect the speaker drive signal across the speaker terminals either way. If the speaker comes with bare wires or a connector, the speaker is still non-polar and you can connect to the wires or the connector either way with the voltage signal.

### Q: How do I drive the speaker?

**A:** Speakers are not driven the same way as piezoelectric transducers. Speakers are rated in Ohms and Watts are typically driven using audio amplifier integrated circuits.

### Q: What voltage do I apply to the speakers?

**A:** The answer depends on what kind of signal you are applying. Speaker power is rated in watts, so you must calculate or measure the average and maximum power being applied to the speaker. Oscilloscopes and other audio measurement equipment can provide these numbers. If a simple signal is being applied to the speaker (such as a sine or square wave), these values can be calculated manually:  $\text{Speaker Wattage} = (V_{\text{rms}} * V_{\text{rms}}) / \text{Impedance}$

## **Mechanical Application Issues**

### **Q: Do your circular bare speakers have mounting holes? How do I mount them?**

**A:** Mallory's circular bare speakers do not have any mounting holes. Customers typically mount the speakers by laying the speakers on a ledge or into a housing that does not touch or obstruct the mylar cone material, and then either use glue or silicone adhesive to secure the speakers to the housing or ledge. Also, care must be taken that the glue or silicone adhesive does not get onto the mylar cone material which could dampen the sound level.

### **Q: Do your circular bare speakers come with wires?**

**A:** No, the bare speakers are not offered standard with wires. However, Mallory does offer the same models with a twisted wire cable assembly and a Molex Microfit 3.0 connector. The suffix “-MX” indicates that the circular speaker comes with this cable assembly.

### **Q: What connector is used on the models that have the suffix “-MX”?**

**A:** Molex Microfit 3.0 Model No. 43025-0200.

### **Q: How do I connect to the connector on the models with suffix “-MX”?**

**A:** The mating connector that needs to be used is Molex Model No. 43020-0201.

### **Q: Can I mount something directly behind the speaker cone.**

**A:** The speaker cone does mechanically flex, so some room is needed in front of or behind the speaker cone to allow for this physical movement. If the design calls for placing something very close to the speaker cone, contact Mallory to verify enough room is available for the speaker cone to flex properly.

### **Q: Can Mallory provide custom terminations?**

**A:** Yes! Visit our contact page on the website or email [info@mallory-sonalert.com](mailto:info@mallory-sonalert.com) or call 317-612-1000

## **Soldering & Washing Issues**

**Q: What is the recommended hand soldering temperature for Mallory audible alarms and speakers?**

**A:** 330°C for 1.5 seconds or 270°C for 4 seconds.

## Sound Issues

### Q: How is sound level measured?

A: Sound level is measured in decibels (abbreviated dB). The dB scale is an arbitrary scale that reflects the loudness of the sound that is being measured. It ranges from 0 dB (threshold of hearing) to 130 dB (threshold of pain). For a better understanding of the decibel sound level scale, see Technical Application Guide, "[Decibel Sound Level Scale](#)".

### Q: How loud does my audible alarm need to be?

A: The audible alarm should be at least 10 dB louder than the ambient background noise so that it can be easily heard. You can estimate the ambient background noise by using the chart found in the Technical Application Guide, "[Decibel Sound Level Scale](#)" or you can use a sound level meter to measure the actual ambient noise level.

### Q: When is a sound level twice as loud as another?

A: Every time the sound level increases by 10 dB, it will sound twice as loud to the human ear. For example, an alarm specified as 90 dB at 2 feet will sound half as loud as one specified as 100 dB at 2 feet.

### Q: What does distance have to do with sound level?

A: Sound level falls off over distance. We intuitively know this because we have to talk louder (or even shout) when people are farther away. The rule of thumb is that every time the distance doubles, the sound level drops off by 6 dB. For example, if an audible alarm measures 60 dB at 2 feet, by the time it reaches 4 feet, it will only be 54 dB. By the time it reaches 8 feet, it will only be 48 dB, and so on.

### Q: How do I calculate the sound level over different distances and wattages.

A: On Mallory's Technical webpage, there is an Excel spreadsheet that enables the calculation of sound level across different distances and wattages.

### Q: How sensitive is the human ear to sound level changes?

A: Most people can only distinguish a sound level change only when it increases or decreases by 3 decibels. For example if a person was listening to an audible alarm that changed from 90 to 92 dB, that person would most likely say that the alarm did not get louder. If the sound level changed from 90 dB to 93 dB, the person would say that the sound level is slightly louder. If the sound level changed from 90 to 96 dB, the person would say that the sound level is significantly louder. If the sound level changed from 90 to 100 dB, the person would say that the sound level is twice as loud as before.

**Q: When should I use a constant tone and when should I use a pulsing tone?**

**A:** Pulsing tones are more easily distinguished than constant tones. Also, pulsing tones convey typically convey more urgency to a person than a constant tone. On the other hand, it takes more electronic circuitry to make a tone pulse, so pulsing audible alarms are usually more expensive than constant tone alarms. If a more pleasant sounding tone is needed, a chime sound may be preferred.

You can listen to the various sounds that Mallory audible alarms make on our SOUNDS webpage.

**Q: What does dBa (A-Weighting) mean?**

**A:** dB is the abbreviation for decibels which is how the sound level of audible alarms is measured. The "a" in dBa means that the sound level was measured on an A-Weighting scale. The A-Weighting scale was developed to compensate for the fact that the human ear is not a perfect microphone. By applying the A-Weighting scale to sound level measurements, you put the different frequencies (pitches) that the audible alarms produce on an even basis (i.e. comparing apples to apples). Mallory always uses A-Weighting for their sound level measurements, but not all audible alarm manufacturers are this diligent.

**Q: Can I model the acoustic sound chamber using Helmholtz equations?**

**A:** Mallory Sonalert has worked with Professors at Rose Hulman University in an attempt to model the sound chamber using Helmholtz equations, but these equations do not work well in predicting the resulting sound characteristics of the alarm. When Mallory Sonalert engineering designs new audible alarms, we rely on past designs and experience to give guidance on a starting point. However, the final design of the sound chamber is based on careful process of building prototype after prototype in order to find that sweet spot in sound performance."

**Q: What is the acoustic sound chamber on your mounted speakers and how does it work?**

**A:** The acoustic sound chamber of audible alarms includes the area inside the housing that is in front of the sounder element and includes the front hole opening.

The sound chamber does not work like organ pipes. In organ pipes, there are standing waves of different size depending on the frequency generated. This is why the organ pipes are different lengths. If the standing wave principle was used for electronic audible alarms, the alarms would have to be many inches or feet in length.

Perhaps the best way to explain how the acoustic sound chamber works is to think of it using a more visceral medium. If you think of the air sound waves being replaced by water, the sound chamber would work by providing an efficient shape for the water to move out of the housing without being obstructed by eddies, reverse currents, and dead spots. Essentially, the acoustic sound chamber provides a low impedance path for the air pressure wave to escape the housing with maximum intensity.

**Q: Can Mallory provide a custom sound?**

**A:** Yes! Visit our CONTACT US webpage or email [info@mallory-sonalert.com](mailto:info@mallory-sonalert.com) or call 317-612-1000

## Environmental Issues

### Q: What is the shelf life of an audible alarm?

A: Mallory is not aware of anyone who has ever had a shelf life issue with our alarms. That being said, some alarm models contain aluminum electrolytic capacitors. The recommended shelf life for these capacitors is 5 to 10 years depending on how they are used. Our application of these capacitors is not especially sensitive to the shelf life issues of these components, so we would expect that they would last 8-10 years or longer in our alarms just sitting on the shelf (no voltage applied during that time).

### Q: What is the ECCN Number for Mallory Alarms, Buzzers, & Speakers?

A: Mallory Sonalert Products alarms, buzzers, and speakers do not require an ECCN Number. However, if you absolutely need to assign an ECCN Number, use EAR99 (which means that our product is not regulated).

### Q: I need a colder or hotter temperature rating for a speaker. Can you provide one?

A: Mallory can see if we can qualify our speaker to your requirement. Visit our CONTACT US webpage, email [info@mallory-sonalert.com](mailto:info@mallory-sonalert.com) or call 317-612-1000

### Q: What environmental tests do your alarms meet?

A: Design Engineering uses a variety of tests during the verification and validation design phases. These tests can include: surge voltage, reverse voltage, hot & cold life tests, room temperature life test, humidity, vibration, shock, salt spray, and terminal strength. The Environmental Tests for each alarm are listed in that alarm's Environmental Durability PDF available on the website.

### Q: What is the Moisture Sensitivity Level (MSL) of Mallory alarms and speakers?

A: MSL 1 (Unlimited)

### Q: Are your speakers water-proof?

A: That is a loaded question. Mylar speakers are typically called water resistant. While water won't hurt the speakers, the speakers are not designed to be submerged in water for extended lengths of time. If possible, the speakers should be shielded from direct water sprays. If the speaker is mounted in a housing, the housing should be mounted down or drain holes should be added to remove any standing water promptly.

### Q: I have a special environmental requirement, can Mallory help me?

A: Yes! Use our CONTACT US webpage, email [info@mallory-sonalert.com](mailto:info@mallory-sonalert.com) or call 317-612-1000

## Warranty

The seller warrants the goods to be supplied hereunder will conform to the pertinent specifications, drawings and approved samples, if furnished, and that such goods will be of good materials and workmanship and free of defects if properly installed and used as sold by Seller. If within one-year period from the date of shipment to Purchaser such goods, not having been subject to misuse, alteration, modification, neglect. Improper installation or unauthorized repairs not exposed to an abnormal environment, are shown not to be in conformity or are shown to be defective in workmanship or materials, Seller's sole and exclusive obligation under this warranty is to repair or replace such goods, provided return is made prepaid to Seller or its designated representative with the following tagged information: (i) date of shipment of such goods to Purchaser; (ii) date such goods are determined to be non-conforming or defective; and (iii) specifying the apparent non-conformity or defect. No claim will be allowed under this warranty unless Purchaser notifies Seller of such claim within 30 days after Purchaser learns of facts giving rise to such claim. Purchaser's failure to test, inspect and make claim within such one-year period shall be conclusive evidence that the goods shipped were satisfactory in all respects. The liability of Seller under the forgoing warranty shall not exceed the price charged by Seller for the goods which give rise to the Purchaser's claim. THE AFORESAID WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESS OR IMPLIED (INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE), EXCEPT OF TITLE. SELLER ASSUMES NO LIABILITY FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL, INCIDENTAL OR OTHER DAMAGES OF ANY TYPE (INCLUDING, BUT NOT LIMITED TO, DAMAGES RELATED TO LOST SALES AND PROFITS, EXCESSIVE OR INCREASED COSTS AND EXPENSES, FIELD RECALL AND RETROFIT, COSTS AND EXPENSES , DOWNTIME COSTS AND CLAIMS OF CUSTOMERS OR PURCHASER FOR SUCH DAMAGES) RESULTING FROM NON-CONFORMING OR DEFECTIVE CONDITION OF ANY GOODS SOLD BY SELLER TO PURCHASER HEREUNDER, AND PURCHASER ASSUMES ALL LIABILITY FOR ALL CONSEQUENCES ARISING OUT OF ITS USE OR SALES OF SUCH GOODS. THE AFORESAID REMEDY OF PURCHASER IS EXCLUSIVE AND THIS LIMITATION OF LIABILITY PROVISION SHALL APPLY TO ANY AND ALL CLAIMS OR SUITS BASED UPON NEGLIGENCE, BREACH OF CONTRACT, BREACH OF WARRANTY, STRICT LIABILITY, OR ANY OTHER LEGAL THEORY UPON WHICH LIABILITY MAY BE ASSERTED AGAINST SELLER BY PURCHASER OF OTHERS.